

THE LUKANGA SWAMPS—NORTHERN RHODESIA

S. C. SEAGRIEF

(*Botany Department, Rhodes University*)

(With Plates I and II).

ABSTRACT

To the west of Broken Hill, N.R., lie the Lukanga Swamps, which occupy an area of approximately 1,000 square miles. The vegetation of the swamps is characteristically zoned according to the depth of the water. In shallow water *Leersia hexandra* is dominant. It is followed successively with increasing depth by *Eleocharis* sp., *Typha* sp., and *Phragmites communis*. *Nymphaea* spp. are generally distributed in all zones. Floating mats of vegetation are of irregular occurrence.

There is some indication that there has been a permanent rise in the water level of the swamps as semi-submerged termite mounds were observed quite far out from the shore at the end of the dry season of 1958.

INTRODUCTION

My reason for going to the Lukanga Swamps in August 1958 was to collect samples for pollen analysis from the basal sediments of open water stretches in the swamps. It is well known that if a suitable surface, such as a growing peat bog or a lake sediment, is available, pollen grains will become incorporated in the deposit as it develops over the years. Thus, in the course of time, a record of the past history of the surrounding vegetation will be preserved in the deposit. Although it was found that the samples contained too few pollen grains for an interpretation of past history to be attempted, it may be of interest to record the general ecological features of the area.

GENERAL ECOLOGY

The Lukanga Swamps lie roughly 40 miles to the west of Broken Hill, Northern Rhodesia. As access to them is difficult I was fortunate in joining an outward bound excursion organised by the Rural District Commissioner for schoolboys from Broken Hill. The swamps occupy an area of approximately 1,000 square miles of a flood plain bounded on

the north-western margin by the Kafue River. Their chief water supply comes from the Lukanga River, which flows into the swamps in the north-eastern corner and then out again in the north-western corner where it joins the Kafue River (see Map). In times of high flood the Kafue River overflows into the swamps by way of channels and "dambos" (equivalent to the South African vleis) and may reverse the flow of the Lukanga River. A further supply of water is derived from small rivers and dambos draining the wooded plateau to the east of the swamps (Macrae, 1934). Little seems to be known about the southern and western margins of the swamps.

At intervals the swamps are broken by expanses of open water. Only one of these, called Chilondo by the Africans, could be investigated during the short visit. It lies approximately 3 miles west of Waya village, which is situated on the eastern margin of the swamps.

Observations on changes in species composition and records of depths of water were made from the bank to Chilondo. It was clear that the distribution of the rooted plant communities was closely linked with depth of the water. Four distinct zones could be recognized over this stretch of swamp. In the wide marginal zone of shallow water a grass, *Leersia hexandra* was dominant. With it occurred occasional clumps of *Cyperus articulatus* and *Phragmites communis*. Wherever pools were present they were colonised by *Nymphaea coerulea*, *Nymphaea capensis* and the submerged aquatics *Ceratophyllum demersum* and *Utricularia*. Channels cut by the African fishermen soon become choked by these species if they are not used frequently.

It was of great interest to find semi-submerged termite mounds up to $\frac{1}{2}$ mile out in the *Leersia* zone. (Plate I, Fig. 1). As termite mounds can only be built on dry land it seems likely that a permanent rise in the water level of the swamps has occurred since the mounds were constructed. There do not appear to be any records of seasonal variations of water level for the swamps. It was apparent from high water marks on the stems of *Phragmites* that a drop in level of two feet had occurred since the previous rainy season. It seems unlikely, even after periods of drought and consequent lower water levels, that the land surface would be exposed for long enough for large termite mounds to be built.

At depths of over four feet (August 1958 level) *Leersia* is replaced by *Eleocharis* sp. (Plate I, Fig. 2). *Eleocharis* sp. has very characteristic dark green terete stems projecting up to three feet above the surface of the water. The only other conspicuous species in the *Eleocharis* zone is *Nymphaea*, although scattered clumps of *Phragmites* and *Typha* occur. At depths greater than seven feet *Typha* sp. become dominant (Plate II, Fig. 1). In some parts it forms pure stands, apart from the everpresent waterlilies



FIG. 1.—*Leersia herandra* zone with semi-submerged termite mounds. The channel is kept open by the frequent passage of dugouts to and from the fishing localities.



FIG. 2.—*Eleocharis* sp. zone showing the very characteristic green stems protruding up to 3 ft. above water level and leaves of *Nymphaea* sp. in right foreground.

PLATE 1.



FIG. 1. *Typha* zone. A tall stand of *Typha* sp. with some *Nymphaea* sp.

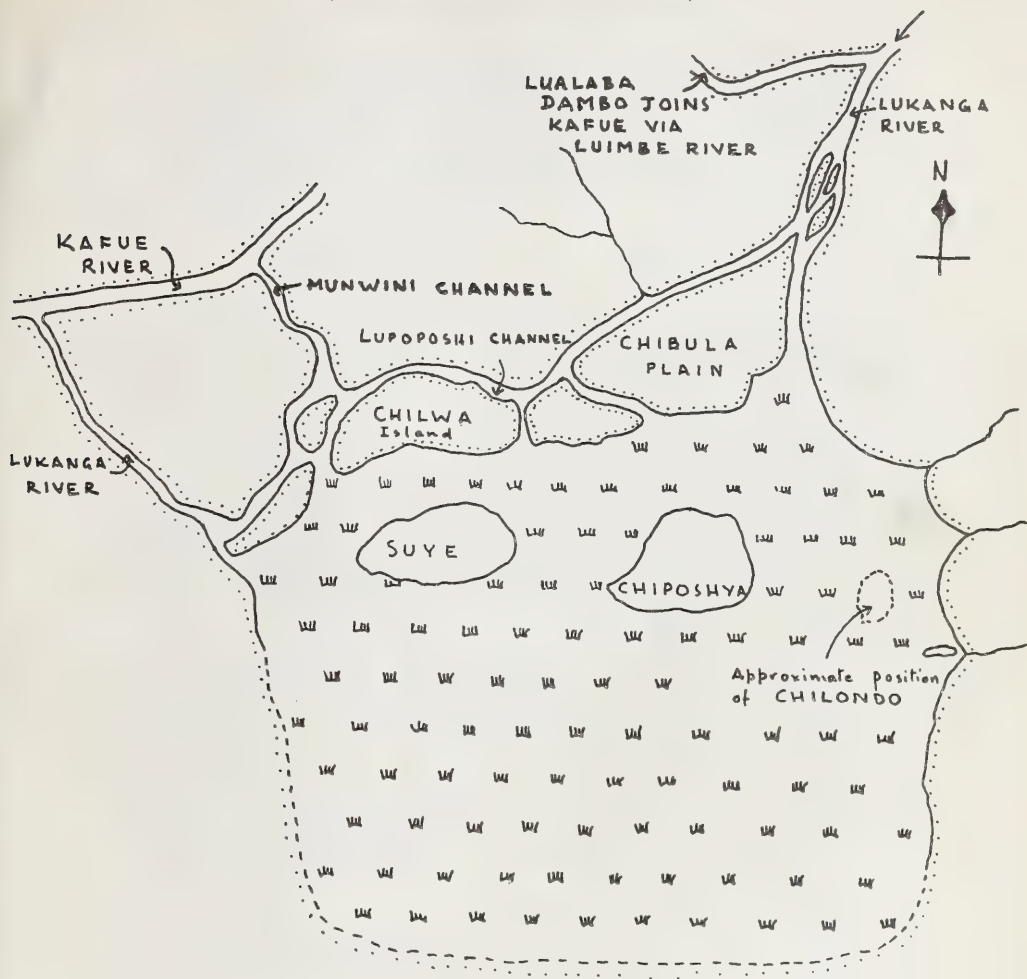


FIG. 2.—*Phragmites* zone. Very closely packed stems of *Phragmites communis* make the passage of boats other than dugouts difficult.

PLATE II.

LUKANGA SWAMPS

(ADAPTED FROM MACRAE, 1934)



0 5 10 15
MILES

- LAND
- W W SWAMP
- - - UNCERTAIN BOUNDARY

and submerged aquatics, while in others it is mixed with *Phragmites*. Floating islands become quite common in the *Typha* zone. Some are strong enough to hold one's weight; others are not. The larger mats tend to have some or all of the following species growing on them:

Aeschynomene sp.	Scirpus cubensis
Hydrocotyle sp.	Leersia hexandra
Marsilea sp.	Crassocephalum picridifolium
Cyperus nudicaulis	Polygonum tomentosum
Pycurus mundtii	Ludwigia leptocarpa

Phragmites communis is the dominant species of the outermost zone, succeeding *Typha* at depths greater than ten feet (Plate II, Fig. 2). On the margin of Chilondo *Phragmites* is rooted fifteen feet below, and the inflorescences tower up to fifteen feet above the surface of the water. In parts *Phragmites* forms almost impenetrable stands with the stems growing so closely that even water lilies are excluded. Large floating mats occur in the *Phragmites* zone and these are much used by African fishermen as platforms for drying fish and for temporary homes. The islands do not appear to extend more than three feet below the surface of the water and so they must be anchored by the stems of *Phragmites*. They have the same species growing on them as in the *Typha* zone. No sign of *Salvinia auriculata* was seen.

In parts the vegetation of the floating mats had been recently burnt off, whether or not this was accidental was not clear. According to the African fisherman it is possible for veld fires to sweep right across the swamps after a particularly dry season.

In the region investigated the four zones were spread over a width of approximately three miles. The *Eleocharis* zone is by far the most striking and well defined of the zones. The most tolerant species appear to be *Phragmites* and *Nymphaea*, as they are widely distributed in all but the shallowest water.

Although only a very small portion of the Lukanga Swamps was examined it seems likely that the sequence of zones—from shallow to deep water—i.e. *Leersia*, *Eleocharis*, *Typha* and *Phragmites*—is of more widespread occurrence in the swamps.

ACKNOWLEDGEMENTS

I am most grateful to the Rural District Commissioner, the school-boys and Mr. Nightingale of Broken Hill for making the expedition possible. I also record my thanks to the University College of Rhodesia and Nyasaland for a travel grant.

REFERENCES

- SHEKLETON, C. 1908. The inhabitants of the "utwa" or Great Lukanga Swamps. *Proceedings of Rhodesia Scientific Association*, 7, pt. 2., 43-54.
- MACRAE, F. B., 1929. The Batwa in the Broken Hill District of Northern Rhodesia. *Southern Rhodesia Native Affairs Department Annual*, 7, 63-75.
1934. The Lukanga Swamps. *Geogr. Journ.* 83, 225-227.
- HAILE, H. P., 1958. Chilwa Island in the Lukanga Swamp. *The Northern Rhodesian Journal*, 6, No. 5, 381-6.